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THE ORTHOPAEDIC FORUM



THE AMERICAN ORTHOPAEDIC ASSOCIATION

Leadership in Orthopaedics since 1887

SYMPOSIUM

SUBSPECIALTY CERTIFICATION: CURRENT STATUS OF ORTHOPAEDIC SUBSPECIALTY CERTIFICATION*

BY KEITH H. BRIDWELL, MD, CHRISTOPHER D. HARNER, MD, DAVID W. POLLY JR., MD, AND PETER J. STERN, MD

During the last twenty years, an increasing number of orthopaedic surgeons have chosen to subspecialize. As such, there has been an increased interest in subspecialty certification.

In 1990, 44% of orthopaedic surgeons viewed themselves as general orthopaedists and 21%, as specialists. Currently, those numbers are largely reversed, with 31% who consider themselves general orthopaedists and 35% who view themselves as specialists (Fig. 1).

The average age of orthopaedic subspecialists is forty-nine years, and the average age of general orthopaedic surgeons is fifty-four years (Fig. 2).

Therein, the anticipated trend is that, with time, an even higher percentage of orthopaedic surgeons will be subspecialists, and the number practicing general orthopaedic surgery will shrink to the point at which general orthopaedic surgeons will be a dramatically smaller percentage of the specialty than those who either exclusively practice a subspecialty or have a strong interest in a subspecialty.

There are advantages and disadvantages to subspecialty certification. The process of accomplishing acceptance of the subspecialty certification by the American Board of Orthopaedic Surgery (ABOS) and the American Board of Medical Specialties (ABMS) is a long, time-consuming one, as documented by the certification processes

for hand surgery and sports medicine. The preparation of the examination is very time-consuming and expensive.

The main purpose of subspecialty certification is to establish a body of knowledge within that field and, ultimately, to improve the quality of medicine being practiced within that subspecialty.

The concerns about subspecialty certification include the time and effort involved with the process, both by those who lead the process to accomplish subspecialty certification and by those who take the examination. Most orthopaedic surgeons do not want to take more examinations. Furthermore, subspecialty certification can be perceived as a threat to those who have not finished an accredited fellowship and who

*Presented at the Annual Meeting of the American Orthopaedic Association, Huntington Beach, California, June 25, 2005.

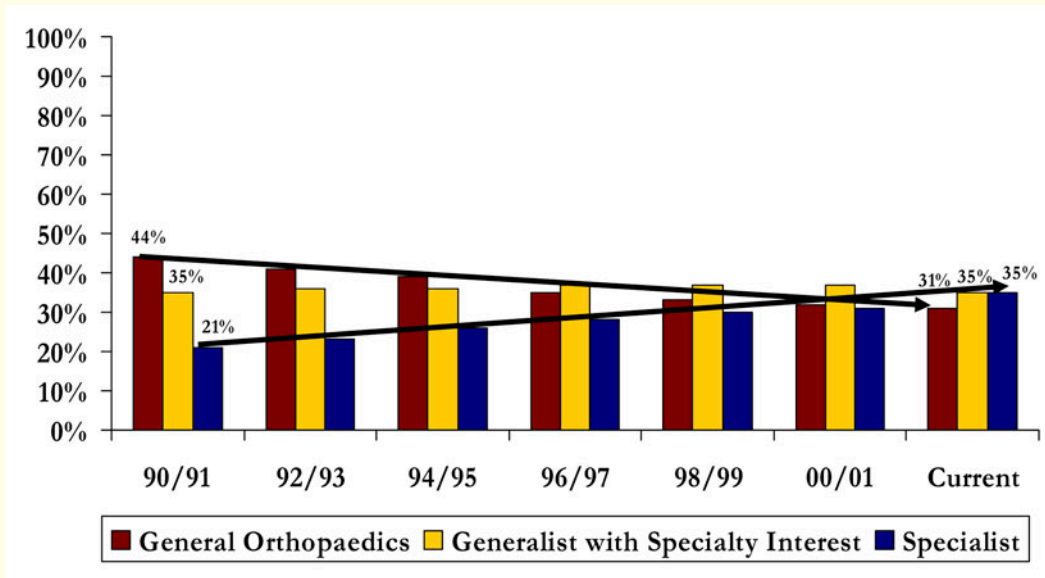


Fig. 1

How orthopaedists view themselves. (Based on data from *Orthopaedic Practice in the U.S. 2002-2003*.⁹)

do not practice that particular subspecialty in a substantial quantity. Hand subspecialty certification has existed for many years now. Sports-medicine certification has just arrived, and the first examination is about to be administered. Spine-spinal deformity subspecialty certification is currently being investigated and is in its early stages. Accomplishing agreement across societies and disciplines outside ortho-

paedic surgery is also an obstacle.

The purpose of this article is to provide an informative review. However, we are not able to provide answers with regard to the overall effect of subspecialty certification on the whole of practicing orthopaedic surgeons.

Subspecialty Certification in Hand Surgery

Hand surgery emerged during World

War II, when it was recognized that reconstruction of traumatic injuries to the hand and upper extremity required a specific body of knowledge that crossed several disciplines, including orthopaedic, general, and plastic surgery¹. This was a time when surgical specialization was in its infancy with the establishment of the ABOS in 1934, the American Board of Surgery (ABS) in 1937, and the American Board of Plas-

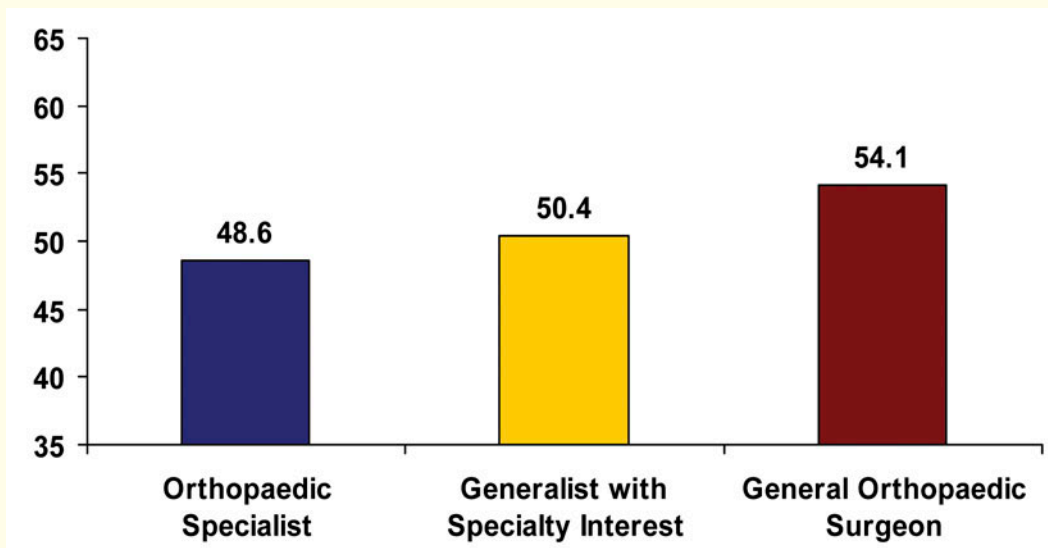


Fig. 2

Mean age by characterization. (Based on data from *Orthopaedic Practice in the U.S. 2002-2003*.⁹)

tic Surgery (ABPS) in 1941. To meet the educational and scientific needs of these three specialties, the American Society for Surgery of the Hand (ASSH) emerged in 1946. The ASSH developed a well-organized program of continuing medical education and later was to become the major promoter of hand surgery as a distinct subspecialty.

Justification for Subspecialty Certification in Hand Surgery

Omer² noted that a medical subspecialty is an identifiable area within a recognized specialty to which a physician devotes considerable time and study. Smith³, in a guest editorial in the *Journal of Hand Surgery*, pointed out that, by the 1970s, there were certain crucial elements that allowed consideration of the development of subspecialty certification in hand surgery.

1. Prevalence of Upper Extremity Disorders

In 1980, Kelsey et al.⁴, in an epidemiologic survey using data from the United States National Health Survey of the National Center for Health Statistics, noted that the annual number of upper-extremity injuries that were of sufficient severity to lead to restriction of activity or a visit to a physician was sixteen million. The total annual cost of upper-extremity injuries, including medical expenses, lost earnings, and indirect costs of injury, was in excess of ten billion dollars. Furthermore, in the mid-1970s, there were nearly twenty-five million people with arthritis, the second most common medical condition for which worker disability allowance was granted. Finally, in 1976, 3.2 million people in the United States reported an upper-extremity impairment.

2. Fragmentation of the Parent Boards (Orthopaedic, Plastic, and General Surgery) by Subspecialty Certification
As subspecialty certification in hand surgery evolved, it was never the intent of its advocates to create an independent board. The three primary boards from which subspecialty certification is

granted are all members of the ABMS, the umbrella organization for the twenty-four federally recognized certifying boards. To qualify to sit for the subspecialty certification examination, one must hold a valid certificate from his or her primary board.

3. A Distinct Body of Knowledge

Hand surgery is not a discipline of special interests or skills; rather, it is a distinct body of knowledge that is required to handle a major medical need. While the three parent boards require knowledge in hand surgery to receive primary certification, subspecialty certification in hand surgery encompasses an in-depth and discrete body of knowledge with elements contributed by all three disciplines.

4. Exclusivity and/or Better Care

There was concern that pressure from the academic or legal community could result in a situation in which certificate holders would be the only physicians permitted to practice hand surgery and, by implication, such surgeons would be thought to render better patient care for hand disorders. In reality, diplomates of all three primary boards are deemed qualified and competent to practice hand surgery. Furthermore, the volume of hand disorders is so great that a small group of physicians would be able to care for only a fraction of the problems. One intent of subspecialty certification is to inform the public and medical colleagues that a certificate holder has met board standards and is qualified to manage complex problems of the hand and upper extremity. Restraint of trade should not and is not the stimulus for hand surgery subspecialty certification.

5. De Facto Certification

One might argue that membership in the ASSH or the American Association of Hand Surgery is enough to demonstrate one's qualifications to practice hand surgery. In reality, medical societies and boards serve different purposes. Medical societies are educational and advocacy associations, while

medical boards set requirements and standards for certification. Boards serve the public to ensure competence in a specific discipline.

History of Subspecialty Certification in Hand Surgery

The development of subspecialty certification was a long and convoluted process that began in 1971 with a dialogue between the ASSH and the ABMS¹. In 1973, the bylaws of the ABMS were revised to permit subspecialty certification. In 1974, the ASSH contacted the three parent boards; however, these boards declined to lend their support to subspecialty certification. Finally, in 1979, at a joint meeting of the ABMS, the three surgical boards, and the ASSH, it was agreed that recognition of hand surgery was desirable, but the mechanism was yet to be determined. The ABMS bylaws defined a Certificate of Special Qualifications as reflecting the possession of knowledge, skill, and training in a special field over and above that required for general certification. By 1981, the three boards not only endorsed the certificate but agreed that the certificate holder must receive a year of additional specialty training and successfully pass an examination. In 1984, the Joint Committee for Surgery of the Hand was formed with representation from the three boards. Its charge was to develop, administer, and score examinations for subspecialty certification. The second part of the equation was to establish fellowship requirements for hand surgery. This was done with the approval of the Accreditation Council for Graduate Medical Education (ACGME) in conjunction with the Residency Review Committees of orthopaedic, plastic, and general surgery. The requirements were identical for each of the three boards.

In 1986, a joint application for subspecialty certification was filed with the ABMS and was unanimously approved. The ABMS staff complimented the three boards on their cooperative effort and noted that it should be a model for future programs.

TABLE I Subspecialty Certification by Board (1989 to 2004)*

	ABOS	ABPS	ABS	Total
No. of candidates who passed examination	1431	537	254	2221
Total no. of candidates who took examination	1477	779	345	2601
Failure rate (%)	3.1	31.2	26.4	14.6

*ABOS = American Board of Orthopaedic Surgery, ABPS = American Board of Plastic Surgery, and ABS = American Board of Surgery.

Highlights of the Requirement for Subspecialty Certification in Hand Surgery

Candidates must:

- Be a diplomate of his or her primary board: orthopaedic surgery, plastic surgery, or surgery.
- Have a currently registered, full, and unrestricted license and full and unrestricted privileges at his or her hospital.
- Have an ethical standing in the profession and moral status in the community acceptable to the primary board.
- Be actively engaged in the practice of hand surgery as indicated by holding full operating privileges in a hospital or surgery center approved by the Joint Commission on Accreditation of Healthcare Organizations.

- Submit a consecutive list of hand surgery cases from a one-year period within two years of the application. The case list must include a minimum of 125 cases from six of nine categories.

From 1989 until July 1994, there were no fellowship requirements to sit for the examination. This was the so-called "grandfather" period. Surgeons actively engaged in the practice of hand surgery who had not necessarily completed a one-year hand-surgery fellowship but met other requirements, such as peer review and case volume, were permitted to sit for the examination. Effective in July 1994, candidates were required to take a one-year fellowship in hand surgery, and, effective in July 1999, candidates had to satisfactorily complete a one-year ACGME-accredited hand-surgery fellowship. It should be noted that the linkage of accreditation and certification has always been an ABMS tradition⁵.

In 1989, the first subspecialty ex-

amination for hand surgery was administered as a ten-year time-limited certificate⁵. It was given to 510 candidates, with 81% holding ABOS certificates and 19% holding ABS certificates (the ABPS did not participate until the following year). The overall failure rate was 7.6%. As of 2004, 2601 individuals had taken the certifying examination, with an overall failure rate of 14.6% (Table I). It is of note that the ABOS candidate failure rate is 3.1%.

Success on the examination correlates with one's primary board (orthopaedic surgery), case volume (>300 hand cases per year), and devoting more than 75% of one's practice to hand surgery. If one meets these three criteria, passage is almost a given.

Recertification

With the subspecialty certificate in hand surgery being time-limited, recertification was first offered in 1996. The requirements for recertification include evidence of continuing medical education, peer review and/or licensure, and successful passage of an examination. The examination component can be accomplished by either a computer-administered examination or an oral examination based on cases selected from the applicant's practice. Since 1996, 980 surgeons have recertified and 916 have met with success, for an overall failure rate of 6.5% (Table II). For the diplomates of the ABOS, 623 have recertified with a 3.4% failure rate.

Beginning in 2004, board-certified orthopaedic surgeons who held a hand subspecialty certificate and chose to recertify in both orthopaedic surgery and hand surgery by the computer-based pathway were required to take an examination consisting of 160

hand subspecialty certification questions and eighty general orthopaedic questions. Interestingly, the percentage of questions that were correctly answered for both the hand and general orthopaedic sections was nearly identical.

Subspecialty Certification and the ASSH

Shortly after the hand subspecialty examination was initiated, the ASSH amended its bylaws to require individuals applying for active membership to possess a subspecialty certificate in hand surgery. Some hand surgeons believe that this amendment leveled the playing field for ASSH membership. No longer is membership in the ASSH a privilege. If a surgeon meets the requirements to sit for the subspecialty examination and passes, ASSH membership is quite likely.

The Future

Under the auspices of the ABMS, recertification for the twenty-four ABMS boards is moving toward a process called Maintenance of Certification. With the rapid changes in medical care coupled with demands from the government, industry, and the public for quality care, physicians must demonstrate continuously that they are proficient in their specialty. As mandated by the ABMS, physicians who elect to maintain certification must:

1. Undergo a review of their professional standing (credentialing and licensure).
2. Participate in continuing medical education.
3. Pass a recertification examination.
4. Have their performance in practice assessed. The assessment meth-

TABLE II Recertification from 1996 to 2004

	ABOS	ABPS	ABS	Total
No. of candidates who passed examination/total no. who took examination	623/645	170/203	114/132	916/980
Failure rate (%)	3.4	16.3	13.6	6.5

*ABOS = American Board of Orthopaedic Surgery, ABPS = American Board of Plastic Surgery, and ABS = American Board of Surgery.

odology is evolving and will probably include patient communication and satisfaction surveys, peer review, and a case list.

In conclusion, it is the author's opinion that most hand surgeons believe subspecialty certification in hand surgery has benefited our specialty and the public. Holding such a certificate does not, and was never intended to, bestow special privileges related to the practice of hand surgery. Furthermore, it does not translate into better patient care. Rather, it allows the public and our professional colleagues to know that the certificate holder has met board standards and is qualified to manage problems related to the hand and upper extremity.

Subspecialty Certification in Sports Medicine

This section describes the story of subspecialty certification in sports medicine as it has unfolded over the last seventeen years.

Background

Subspecialty certification (formerly a Certificate of Added Qualification or CAQ) was established by the ABMS to recognize new medical science and practice patterns that evolve over time in the various specialties⁶. Orthopaedics is one of the twenty-four member boards in the ABMS. The main purpose of all member boards is to "provide assurance to the public that a physician specialist certified by a Member Board of the ABMS has successfully completed an approved educational program . . ."⁶ Currently, there are ninety subspecialty certificates (with a range of two to seventeen per specialty) offered by the various boards. Of the nine surgical

boards, five offer subspecialty certificates (with a range of two to five certificates per board). Orthopaedics now has two subspecialty certificates in hand and sports medicine.

Why?

For each subspecialty, there are different issues and reasons to pursue or not to pursue subspecialty certification. The process is not easy, it is time-consuming (seventeen years for the Certificate of Added Qualification in Surgery of the Hand), and it is potentially very costly. Therefore, the decision to proceed must be carefully and clearly defined. For orthopaedic sports medicine, this process started in 1988. After extensive discussions, meetings, surveys, and debates (see history section below), it was agreed on by the leadership that sports medicine has a unique body of knowledge and an area of practice worthy of subspecialty status. It was also thought that this body of knowledge was becoming more complex, distinct, and difficult to obtain in a five-year general orthopaedic residency. This position is further supported by data on subspecialty selection by graduating orthopaedic surgery residents. Over the last several years, approximately one-third of residents (approximately 200 per year) have pursued a sports-medicine fellowship. The reason for this is probably multifactorial, including scientific interests, personal interests, or economics. Finally, it was thought, given the large number of programs (currently ninety-five) and fellows graduating per year (203 in 2004), that "raising the bar" and unifying the educational experience were important. Currently, sixty-three of the ninety-five programs are accredited by the ACGME

(in 2004, fifty-five were accredited).

History

In 1988, an ad hoc committee chaired by John Bergfeld, MD, was formed by the American Orthopaedic Society for Sports Medicine (AOSSM) to begin the process. The initial application was drafted in 1989. Concurrently, the Orthopaedic Sports Medicine Member and Fellowship Curriculum (which defined the "body of knowledge") was being formulated⁷. During the ensuing thirteen years, there were ongoing discussions between the American Academy of Orthopaedic Surgeons (AAOS) and the AOSSM. The AAOS position during this time was in opposition to subspecialty certification. In 1992, the ABMS awarded certification status for primary-care sports medicine to four member boards (Family Practice, Pediatrics, Internal Medicine, and Emergency Medicine). Subsequently in 1994, the AOSSM submitted its first draft of the application to the ABOS for review. The ABOS made significant recommendations on the initial application, which spurred a whole new reevaluation by the AOSSM. In 1996, John Bergfeld stepped down as Chair of the ad hoc committee and I (C.D.H.) was appointed. Major modifications in the application were made, and ongoing discussions with leaders and members of AOSSM were conducted. These included publications, debates, and a survey in 1999 of 555 AOSSM members (42% responded) and 612 nonmembers (57% responded)⁸. From this survey, it was determined that:

1. The majority of those who participated favored subspecialty certification.

2. When the data were adjusted

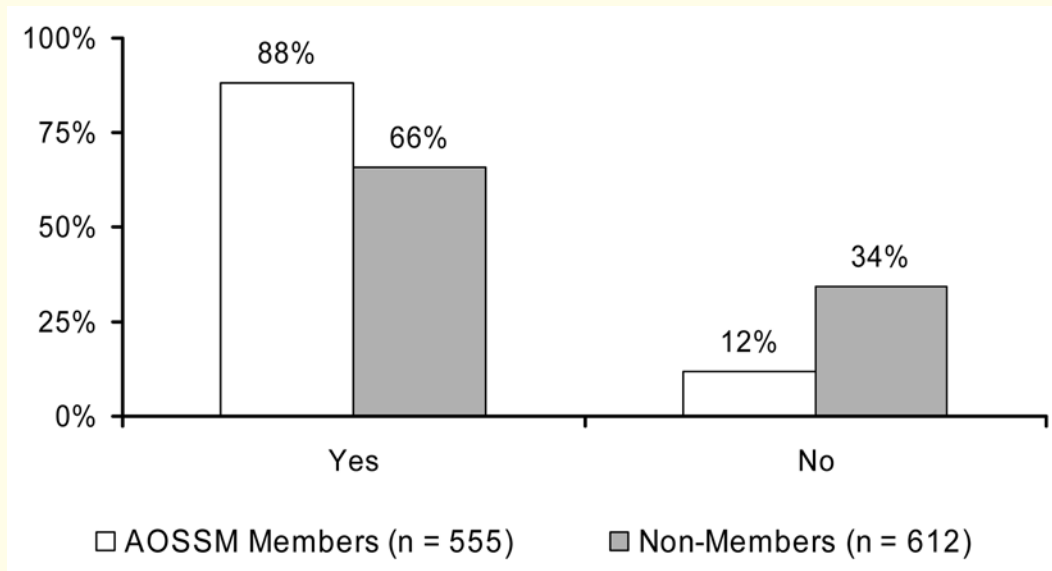


Fig. 3

Survey question: Is orthopaedic sports medicine a unique body of knowledge or area of practice? AOSSM = American Orthopaedic Society for Sports Medicine.

for age, a substantial majority of younger members favored certification.

3. The main reason for supporting certification was to establish a universal higher standard of training.

4. The main reason for opposition is the “burden” of certifying.

Clearly, the majority who took

the survey (members and nonmembers) believed that there was a unique body of knowledge and area of practice (Fig. 3) and would pursue certification if it was offered (Fig. 4).

In October 2000, the AOSSM Board voted to submit the new application to the ABOS. In September 2001,

the ABOS voted to forward this new application to the ABMS with only minor modifications. In the spring of 2002, the ABMS returned the application with minor modifications. Finally, in March 2003, the ABMS voted unanimously to approve Subspecialty Certification in Orthopaedic Sports Medicine.

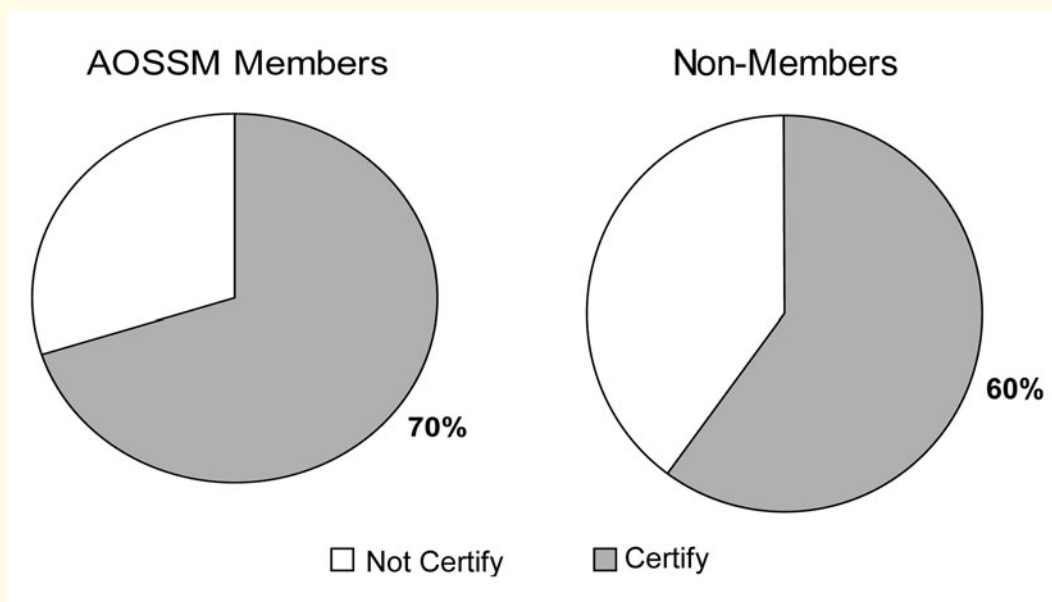


Fig. 4

Survey question: Would members seek certification if orthopaedic sports medicine certification were available? AOSSM = American Orthopaedic Society for Sports Medicine.

Where Are We?

The examination is now being constructed by the ABOS. This process will be directly supervised and monitored by the National Board of Medical Examiners (NBME), which also administers the United States Medical Licensing Examination (USMLE) Steps 1, 2, and 3 and the Orthopaedic Surgery Part-I certification examination. The examination (approximately 200 multiple-choice questions) will be based on the Fellowship Curriculum⁷. The questions will be written at a content level that a graduating fellow is expected to know. There will be a substantial percentage of questions in the areas of evaluation and nonoperative management. Since sports medicine is a cross-disciplinary subspecialty with overlapping knowledge in other specialties and subspecialties, the examination will include a considerable number of questions in these areas. The content breakdown (and approximate percentages) is as follows:

- I. General principles (research methodology, study design, statistics, ethics, and professionalism) 5%
- II. Medical aspects of sports 20%
- III. Musculoskeletal system 75%
 - Upper extremity 30%
 - Lower extremity 40%
 - Spine 5%

The timeline for the examination has been outlined by the ABOS and NBME. The initial Question Writing Task Force was chosen by the ABOS in the summer of 2004 and consists of sixteen experienced individuals from academic and private practice programs. In February 2005, the Question Writing Task Force wrote and approved 400 questions for the next phase. Over the next two years, the examination will go through numerous different task forces and committees so that it will be developed into a high-quality, reproducible (precise and reliable), and accurate (valid) examination. It is being carefully constructed so that it will reflect the "body of knowledge" of the subspecialty. The estimated date for the first test will be in the fall of 2007.

Recently, the ABOS approved the requirements for sitting for the examination. This includes educational requirements (continuing medical education), license requirements (state), board certification, and practice requirements. Within the practice requirements, examinees will have to have performed 115 sports-medicine-related surgical cases and ten nonoperative cases and document that they have a practice in orthopaedic sports medicine. For the first five years after initiation of the examination, all those who meet the basic requirements will be eligible to take the examination. Beginning in the sixth year (2012), examinees will have to graduate from an ACGME-accredited fellowship program.

Conclusions

Subspecialty certification is a by-product of expanding medical knowledge. It is not easy to achieve, and each subspecialty must decide whether it is worth the effort. For orthopaedic sports medicine, the reasons for pursuing or not pursuing it were carefully debated before proceeding with the process. In the end, it was decided that orthopaedic sports medicine did encompass a unique body of knowledge and area of practice that could not be achieved in a five-year general orthopaedic residency. Finally, it was thought that subspecialty certification for sports medicine would achieve the following:

1. Raise the educational "bar" for sports-medicine fellowship programs.
2. Achieve a common high standard of education for fellows.
3. Provide for the long-term growth and health of the subspecialty.
4. Serve as an educational standard and not a practice standard.

It is important to note that, at this time, subspecialty certification is not a requirement to become a member of the AOSSM (unlike the Hand Society). See the requirements at www.aossm.org.

What Is a Spine Surgeon?

When patients try to identify a spine surgeon, they run into a conflict. There

are two basic paths to spine surgery. The ABOS recognizes spinal surgery as a component of its requirement for certification in orthopaedic surgery. Spinal surgery also falls into the domain of the American Board of Neurological Surgery. The challenge is in the actual practice of spinal surgery. Some orthopaedic surgeons exclusively do spinal surgery, and some, perhaps the majority, do no spinal surgery. Similarly for neurosurgeons, most do some spinal surgery, but not all do spinal surgery. Also, for the orthopaedic spine surgeons and neurological spine surgeons, there are types of cases that some do and that others do not and vice versa. Therefore, it is a confusing environment for patients as well as for referring physicians, who need to know what kind of spine problem to refer to what kind of surgeon.

In the past, there was a typical relationship between neurological surgeons and orthopaedic surgeons, in which neurosurgeons would do spinal decompression and orthopaedic surgeons would do spinal stabilization. Often, in such cases, the orthopaedic and neurological surgeons worked as co-surgeons. What has happened more recently, because of a variety of factors, is that it is now common for orthopaedic surgeons to do decompressive surgeries, and it is more common for neurosurgeons to do spinal stabilization surgeries. There are certain classic boundaries, such as the treatment of intradural tumors being done only by neurosurgeons and scoliosis or spinal deformity surgery being done only by orthopaedic surgeons, but those boundaries are being crossed in both directions. So, this establishes the dilemma faced by both the patients and the medical community.

In this fertile ground has blossomed the discussion about subspecialty certification. There have been a myriad of efforts to come together to define the spine surgeon, but to date they have floundered on the rocky shores of the many considerations of both disciplines. The North American Spine Society was initially founded as an attempt to bring together these two

specialties. However, the North American Spine Society involved many non-surgical specialties. As a result, it represents a society of those involved in spine care, but it is not a spine surgeon society. The Scoliosis Research Society has existed since 1966 and has been actively involved with organized orthopaedic surgery. Similarly, the Cervical Spine Research Society was founded by and has been under the auspices of the AAOS for many years, but it has been a meeting ground for both orthopaedic surgery and neurosurgery. The International Society for Study of the Lumbar Spine may also represent a similar meeting ground of orthopaedic surgery, neurosurgery, and other disciplines. However, a strictly surgically oriented spine society addressing the whole impact of the spine has been somewhat limited to date. Some of the frustration with the process of organized medicine toward the definition of spine surgery as a particular discipline (be it a subspecialty expertise or a certificate of added qualification) has resulted in the development of an organization outside the ABMS. Specifically, it has led to the development of the American College of Spine Surgery and the American Board of Spine Surgery. This is not an ABMS-recognized board; however, it has been recognized by the legislature in the state of California in part because of the challenges noted above.

Similarly, within the field of neurological surgery, there has been a growing recognition of the demands of the field of spine surgery as being different from routine neurosurgery residency training. This has led to increased activity at the Joint Section meeting, which is the combined meeting of the Congress of Neurological Surgeons and the American Association of Neurological Surgeons, which has several breakout groups. These include peripheral nerve surgery and spine surgery. Currently, there has been increasing attendance, especially among young neurosurgeons at the joint section, and there has been a changing agenda based

on their desire to further understand the complexities of spinal deformity and spinal instrumentation. This has led to a substantial number of orthopaedic spine surgeons being invited as faculty members and lecturers for this meeting in order to share ideas and understanding about the spine.

Within organized orthopaedics, it was recognized that defining spine surgery as a subspecialty ran into all of the problems of the interaction with neurosurgery. Ronald DeWald¹⁰, in an effort to both side-step this dilemma and advance the recognition of this domain of expertise, sought to establish what he thought would be a less controversial subspecialty certification process, that of spinal deformity surgery. Spinal deformity surgery has been more recognized as a domain falling within the field of orthopaedics, since our name, which implies "to straighten the child," is well exemplified in the care of patients with scoliosis. Dr. DeWald has trained a great number of spinal deformity surgeons as well as many leaders within the field of orthopaedics. He recognized from the start that, in order to define a field of subspecialty expertise, a curriculum is a key and critical component. With the support of the Scoliosis Research Society, he developed a comprehensive textbook of spinal deformity surgery. This textbook has been quite well received throughout the field as representing a comprehensive treatise on the field of spinal deformity surgery. Necessarily, it includes basic spine anatomy and pathophysiology, as well as more extensive discussion on spinal deformity care. He attempted to move this body of knowledge forward under the auspices of the Scoliosis Research Society. While it was initially well received, there was a perception among pediatric orthopaedic surgeons that this appeared to be an attempt to disenfranchise them. In fact, this was not the case. The proposal was defined quite broadly in order to allow pediatric orthopaedic surgeons with spine surgery training to become certified as spinal deformity surgeons. After extensive debate by the Scoliosis

Research Society Board of Directors, the decision was made to support the concept and move forward to the ABOS with a request for subspecialty certification in the area of spinal deformity surgery. Upon review, the board believed that the body of knowledge was not adequately defined and that, before the board acted on it, it would require the concurrence of all possible parties involved, including pediatric orthopaedics and neurosurgery. Interestingly, this throws the problem back into the same dilemma that to date has been irreconcilable between the specialties of orthopaedic surgery and neurosurgery.

Data from the 2003 ABOS recertification process indicated that 693 surgeons took the examination by means of one of multiple pathways. Of those, fifty-five (approximately 8%) chose the spine-based computerized examination.

From the perspective of the ABOS, there is the issue of the cost associated with the development and administration of a subspecialty certification examination. It takes about 500 to 600 questions in order to rotate through 200 questions per session and still keep the examination secure. Question-writing and validation typically costs about \$2500 per question. So the minimum cost would be \$1,250,000, with a maximum of \$1,500,000. There are also costs associated with examination administration. As someone who has written and reviewed questions for the AAOS spine self-assessment examination, I (D.W.P. Jr.) cannot say with certainty that there are 600 questions on spine deformity that can be written and validated. Certainly, there are many more questions that can be asked, but evidence-based answers are more elusive. Opinion runs strong, but consensus answers are more difficult to find. Simply asking a group of spinal deformity surgeons to select fusion levels and provide a basis for their decisions results in an interesting dialogue.

In the recognition of real-world forces, it is clear that orthopaedic chair-

men and neurosurgery chairmen do not want to give up the revenue stream associated with spine surgery. There is a requirement for this education process in both fields, but there is also a desire to have at least some control of or access to this revenue stream. This has made it difficult to move forward on a content-based approach in general.

With the development of newer generations of neurosurgeons and orthopaedic spine surgeons, previous stereotypical thoughts about skill sets from the parent-discipline training may no longer apply. There have been fellowship programs that accept both orthopaedic surgery and neurosurgery-trained residents. There have even been combined orthopaedic-neurosurgery spine surgery services developing across the country with combined fellowship programs. I personally believe that both disciplines are strengthened when the two efforts are brought together. The neurosurgical understanding of intradural processes, as well as handling of problems such as dural leaks, exceeds that of the conventional orthopaedic training. Similarly, the orthopaedic training and teaching about overall musculoskeletal function and, specifically, the understanding of bone biology as well as instrumentation bring much to the table as well.

So the dilemma that must be resolved remains. How does the patient identify who is a spine surgeon? Is he or she the person who simply appends that logo to his or her name in the yellow pages? How does a referring physician identify who is a spine surgeon? He or she is not necessarily an orthopaedic surgeon or a neurosurgeon. If organized medicine is unable to help make this definition, then there will be rogue efforts outside organized medicine that may obviate the role of the ABMS. This may or may not be a good thing, but a definition is needed whether we establish it within organized medicine or have it established for us.

Epilogue

When this topic was presented as a

symposium at the Annual Meeting of the American Orthopaedic Association (AOA) in Huntington Beach, California, on June 25, 2005, there was extensive discussion with considerable interaction between the audience and panel. A series of audience response questions was presented before and after the lectures and discussion.

It appeared that a plurality of the audience recognized that the main purpose of subspecialty certification is to improve the educational standards and offerings of that subspecialty. Approximately 20% still believed that the purpose was to limit the number of those practicing in the subspecialty to those who have completed a fellowship.

Fifty-four percent of the audience seemed to think that the biggest drawback to subspecialty certification was fragmentation of the profession of orthopaedic surgery. Those of us on the panel believe that the biggest drawback is the time, energy, and expense of achieving subspecialty certification and administering the examination.

What we do not know is the makeup of the audience attending this symposium. We do know that, in general, the older and more "generalist" the orthopaedic surgeon was, the more unfavorable the response was toward subspecialty certification. The younger and more "subspecialist" the orthopaedic surgeon was, the more likely the response was to be favorable.

Clearly, "time will tell" with regard to opinions on sports-medicine subspecialty certification. It appeared that the negative views were related to concerns about the fragmentation of orthopaedic surgery and the potential effect of limiting the number of those practicing in the subspecialty to those who have completed a fellowship. Two-thirds believed that hand subspecialty certification has been positive. The audience was split 50-50 on whether spine subspecialty certification should proceed.

Ultimately, the issue of subspecialty certification raises questions about an "educational standard" com-

pared with a "practice standard." Although the intent is to provide an ultimate "educational standard," the result inevitably translates into some form of "practice standard."

There may be distinctions among hand, sports, and spinal surgery. Most members of the AOA perceive hand and spine surgery to be more "specialized." Non-fellowship-trained surgeons are performing more "sports" procedures than hand and spine procedures. Furthermore, sports surgery is more clearly identified with orthopaedics than with hand and spine surgery, which are substantially practiced by plastic reconstructive surgeons and neurosurgeons, respectively. This is not to say that subspecialty certification is not appropriate for sports surgery, but there is more apparent "sports" controversy about whether subspecialization is fragmenting or improving orthopaedic surgery.

This symposium cannot answer the question: "Are we fragmenting or improving orthopaedic surgery?" On the basis of the opinions of the authors of this article and the audience response to questions at the AOA symposium, it appears that what we are seeing in association with subspecialty certification is an improvement in the "educational standards" but also further fragmentation of orthopaedic surgery. This does not answer the question of whether it is more important to improve the educational standards or to limit fragmentation of the specialty. In order to answer this question in the future, the AOA might consider a task force to assemble a survey of AOA and AAOS members to shed further light on this controversy. It is certainly our hope that this evolutionary process does not antique or discourage the generalist.

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